PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

REC'D 17 NOV 2005
WIPO PCT

Applicant's or agent's file reference 62562A	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. PCT/US2004/017103	International filing date *(day/month/year)* 02.06.2004	Priority date *(day/month/year)* 22.08.2003
International Patent Classification (IPC) or national classification and IPC B01J23/68, B01J37/06, C07D301/10, B01J21/04, B01J21/12		
Applicant UNION CARBIDE CHEMICALS & PLASTICS TECH... et al.		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *sent to the applicant and to the International Bureau)* a total of 2 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the opinion
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☐	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
20.06.2005	16.11.2005
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer de Cauwer, R Telephone No. +49 89 2399-7344

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/US2004/017103

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
   - ☐ international search (under Rules 12.3 and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4)
   - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

   Description, Pages

   1-31 as originally filed

   Claims, Numbers

   1-15 received on 22.06.2005 with letter of 20.06.2005

   ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/US2004/017103

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	
	No:	Claims	1-15
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-15
Industrial applicability (IA)	Yes:	Claims	1-15
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

1. Although claims 1, 5, 11 and 12 have been drafted as separate independent claims, they appear to relate effectively to the same subject-matter and to differ from each other only with regard to the definition of the subject-matter for which protection is sought. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.

2. The documents D1-D14 (see cited passages in the search report) all disclose a modified carrier/catalyst and method of making the same by impregnating a preformed alpha-alumina carrier (= any commercially available alpha alumina, see p. 5, l. 8-9) a) with a modifier selected from alkali metal silicates and alkaline earth metal silicates (either added as such or formed *in situ*), b) drying and c) calcining said dried carrier (and d) depositing silver catalytic material on said carrier).

   The present application does therefore not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1-15 is not new in the sense of Article 33(2) PCT.

CLAIMS:

1. A method for the preparation of a modified carrier for a catalyst to be used for the vapor phase epoxidation of alkene, comprising:

a) impregnating a preformed alpha-alumina carrier, which has been subjected to calcining and, optionally, other preforming treatments, as part of the preforming process, with at least one modifier selected from among alkali metal silicates and alkaline earth metal silicates;

b) drying said impregnated carrier; and

c) calcining said dried carrier.

2. The method of claim 1, wherein said modifier is selected from a group consisting of sodium silicates, lithium silicates and potassium silicates or mixtures thereof.

3. The method of claim 1, wherein said modifier is a sodium silicate with stoichiometry, Na2O-2.6 SiO2.

4. The method of claim 1, wherein said drying is carried out at a temperature not exceeding about 250 degrees C. for at least the first two hours following said impregnation.

5. A method for the preparation of a catalyst to be used for the vapor phase epoxidation of alkene, comprising:

a) impregnating a preformed alpha-alumina carrier, which has been subjected to calcining and, optionally, other preforming treatments, as part of the preforming process, with at least one modifier selected from among alkali metal silicates and alkaline metal earth silicates

b) drying said impregnated carrier;

c) calcining said dried carrier; and

d) depositing silver catalytic material on said dried carrier.

6. The method of claim 5 wherein at least one efficiency enhancing promoter is deposited on said preformed alpha-alumina.

7. The method of claim 6 wherein said efficiency enhancing promoter is selected from a group consisting of at least one alkali metal, alkaline earth metal or oxyanion of an element, other than oxygen, having an atomic number of 5 to 83 and being selected from groups 3b through 7b and 3a through 7a of the Periodic Table.

8. The method of claim 6 wherein the said efficiency enhancing promoter is a salt of a member of a redox-half reaction pair.

9. The method of claim 6 wherein said efficiency enhancing promoter is a rhenium component.

10. The method of claim 1 or 5 where in said alkene is ethylene.

11. A modified carrier for a catalyst to be used for the vapor phase epoxidation of alkene prepared by a method comprising:

a) impregnating a preformed alpha-alumina carrier, which has been subjected to calcining and, optionally, other preforming treatments, as part of the preforming process, with at least one modifier selected from among alkali metal silicates and alkaline earth metal silicates;

b) drying said impregnated carrier; and

c) calcining said dried carrier.

12. A novel catalyst to be used for the vapor phase epoxidation of alkene prepared by a method comprising:

a) impregnating a preformed alpha-alumina carrier, which has been subjected to calcining and, optionally, other preforming treatments, as part of the preforming process, with at least one modifier selected from among alkali metal silicates and alkaline earth metal silicates;

b) drying said impregnated carrier;

c) calcining said dried carrier; and

d) depositing silver catalytic material on said dried carrier

13. The method of claim 1 wherein the preformed alpha-alumina carrier comprises a platelet/fluoride-containing type alumina having at least 95% by weight alpha-alumina, a unique interlocking platelet morphology, and a surface area of at least about 0.5 m2/g, a pore volume of at least about 0.5 cc/g, and a median pore diameter between about 1 to 25 microns.

14. The method of claim 13 wherein the modifier is a sodium silicate with stoichiometry, Na2O-2.6 SiO2.

15. The method of claim 1 or 13 wherein said modified carrier is washed after calcination.